REMARKS

Applicants respectfully request the Examiner to reconsider the claims currently in the application in view of the following remarks and in accordance with the provisions of 37 C.F.R §1.116.

Claims 1-38 are pending in the application. Claims 1-38 are rejected.

Before discussing the specific rejection below, Applicants would like to clarify usage of various altitude terms among the references used by the Examiner in his rejections below. Hancock describes an "altitude differential" to be an altitude difference between two aircraft. Masumoto describes a "relative altitude" Z2 (see e.g., column 5, line 20) to be an altitude provided by an air pressure altimeter, which Applicants understands to be an altitude relative to a local *ground reference*. Masumoto also describes a "present altitude" or an "absolute altitude," which Applicants understand to be an *altitude above sea level*, which can be generated as an altitude Z1 by a GPS system (see e.g., column 5, line 4), or as an estimated altitude Z provided by a combination of the "relative altitude" Z2 provided by the altimeter, corrected by an earlier GPS measurement of "absolute altitude" Z1 (see e.g. column 5, lines 20-27). In contrast, as described below, Claim 1 describes an "*an absolute altitude* of the object *relative to a geographic reference*." The claimed geographic reference can either be sea level or a local ground reference. Thus, it should be understood that the present invention is not limited to a display of altitude relative to sea level. Now, turning to the specific rejections:

The Rejections under 35 U.S.C. §103(a)

The Examiner rejects Claims 1-38 under 35 U.S.C. §103(a) as being unpatentable over Hancock (U.S. Patent number 5,179,377) in view of Beasley (U.S. Patent number 5,845,874) and further in view of Masumoto (U.S. Patent number 5,210,540). Independent Claims 1 and 9-13 each set forth systems and methods for conveying to a user an *absolute altitude of an object relative to a geographic reference*, by way of a characteristic of an icon representing the object on a radar display, wherein the icon characteristic changes in a substantially monotonic fashion

in relation to the altitude. The Examiner recognizes that Hancock does not disclose the idea of representing an absolute altitude of the object relative to a geographic reference. The Examiner also recognizes that Hancock neither describes nor suggests the idea of changing a characteristic of an icon in response to changing an absolute altitude of an object. The Examiner relies upon Masumoto to teach the idea of generating absolute altitude data of an object. The Examiner relies upon Beasley to teach the idea of changing an icon characteristic in response to changing of absolute altitude of an object.

With regard to Beasley, the Examiner concludes that "[i]t would have been obvious to one skilled in the art to incorporate the teaching of Beasley into the teaching of Hancock [i.e. adding the representation of absolute altitude of aircrafts in display]... ." With regard to Masumoto, the Examiner concludes that "[i]t would have been obvious to one skilled in the art to incorporate the teaching of Masumoto into the teaching of Hancock [i.e. utilizing of absolute altitude data of the object rather that using of differential altitudes data]... ."

Hancock, at column 4, lines 9-10, in describing Fig. 2, discloses a traffic situation awareness display on a craft (abstract), which is described to be an aircraft and for which "...the size of aircraft symbol 42, 44 or 50 has a size related to *altitude differential* from own aircraft represented by symbol 22... ." Applicants understand Hancock to describe, for example, in conjunction with Fig. 2, a display for which icons associated with aircraft displaced a particular amount both above and below own aircraft are shown having the same size. Thus, Hancock provides a display, which allows a user to visualize altitude conflicts with his (or her) own aircraft. With the Hancock display, however, a user cannot tell from the icon whether an aircraft (or other object) is above or below the user's aircraft. This is because an icon that represents an aircraft 1000 feet below the user's aircraft is the same size as an icon that represents an aircraft 1000 feet above the user's aircraft.

The Examiner relies upon Beasley to teach a color characteristic of a display icon that changes in response to an altitude. Beasley describes an air traffic control system having visual representations of simulated wake vortices that "...allows the user to direct aircraft around

potentially harmful wake vortices." (abstract) Beasley also describes in relation to FIGS. 4 and 5, at column 5, lines 38-43

> Conventional air traffic control displays and radar displays depict a fixed "god's eye" view of airspace 470. In other words, the viewer looks down through airspace 470 onto runway 410. These types of displays typically include altitude information in the form of a number accompanying an image or blip of the aircraft being displayed. Other displays use a color of the aircraft to indicate altitude information. However, numerical or color altitude information displayed as such do not enable the viewer to visualize the relative distances in three dimensions of the various displayed aircraft.

Applicants submit that, even if the color representations described as conventional by Beasley were combined into the invention of Hancock, still the claimed invention would not result. A combination of Hancock and Beasley would result in the system of Hancock, wherein the color (as in Beasley) of aircraft symbols shown on a radar display would have a color related to *altitude differential* (as in Hancock) from own aircraft. Thus, the combination of Hancock and Beasley would still not provide the *icon characteristic* representative of *absolute altitude relative to a geographic reference* as claimed.

Applicants submit that Masumoto fails to overcome the above deficiencies in Hancock and Beasley. Masumoto teaches a global positioning system that generates "present position" data, which can include "absolute altitude" data, the meaning of which in Masumoto, as described above, Applicants understand to be an altitude above sea level. Masumoto does not describe or suggest a means for display of the altitude data. Merely having the altitude data, without a stated means for display, Applicants understand that the altitude data display of Masumoto to be conventional, i.e., a numerical display. Applicants submit that Masumoto provides no more guidance to one of ordinary skill in the art faced with the problems faced by the Applicants, than guidance provided by a conventional air traffic control system, which Applicants seek to improve. As stated in the Background section of the present application, some conventional air traffic control systems display altitude of each aircraft as a respective number.

Applicants submit that, even if the altitude data described by Masumoto were combined with the invention of Hancock, still the claimed invention would not result. A combination of Hancock and Masumoto would result in the system of Hancock, wherein the *differential altitude* of aircraft symbols shown on a radar display would be displayed as a number. The combination of Hancock and Masumoto would not provide the *icon characteristic* representative of *absolute altitude relative to a geographic reference* as claimed.

As the Examiner is aware, and as found in MPEP §2143.01, in order to establish a prima facie case of obviousness "...[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious."

Applicants submit that a further different combination of Hancock and Beasley, which does not relate colors of aircraft icons to *differential altitudes*, but which instead relates colors of aircraft icons to *absolute altitude*, destroys the intended function of Hancock, and therefore, alters the fundamental principle of operation of Hancock, which is to display a representation of *differential altitude* to the operator of an aircraft. Therefore, Applicants submit that the above-described combination of Hancock and Beasley, which instead relates colors of aircraft icons to *absolute altitude*, changes the principle of operation of Hancock, and is not a proper combination of references.

Applicants also submit that a further different combination of Hancock and Masumoto, which does not relate the sizes of the icons of Hancock to *differential altitude*, but instead relates the sizes of the icons to "absolute altitude" (altitude above sea level) of Masumoto destroys the intended function of Hancock, and therefore, alters the fundamental principle of operation of Hancock, which is to display a representation of *differential altitude* to the operator of an aircraft. Therefore, Applicants submit that the above-described combination of Hancock and Masumoto, which instead relates sizes of aircraft icons to "absolute altitude," changes the principle of operation of Hancock, and is not a proper combination of references.

Furthermore, as the Examiner is aware, and as found in MPEP §2142, in order to establish a prima facie case of obviousness "...there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." Applicants respectfully submit that the Examiner has not met this burden in order to establish prima facie obviousness.

Hancock teaches a particular way in which aircraft *differential altitude* can be represented by way of aircraft *icon size* on a radar display. Applicants submit that, already having the representation of aircraft *differential altitude* by way of aircraft *icon size*, Hancock would not be motivated to search for another *different* (and potentially more complex) way (e.g., color display as in Beasley) to represent aircraft *differential altitude* on the radar display as would be required by a combination of Hancock with Beasley and/or with Masumoto.

Applicants also submit that Hancock would not be motivated to represent the claimed *absolute altitude relative to a geographic reference* on a radar display as suggested by the Examiner, since that is not the display representation that he has selected to be best solution to the problem he attempts to solve. Hancock describes the problem he attempts to solve, for example, at column 1, lines 50-53, where Hancock states "...pilots often find it time consuming and confusing to visually acquire and process dynamic changes in the air traffic situation under moderate or high cockpit work load conditions."

At column 1, lines 54-66, Hancock further states that:

> Attempts of the related art to solve the problems of indirect visualization of conventional displays have focused on basic symbology refinement for the two-dimensional TCAS display format. Efforts have been made to reduce confusion and misinterpretation by modifying the symbols. For example, all the numeric codes were intially displayed above the aircraft symbol with a "plus" or "minus" sign *to indicate relative elevation*. The most current baseline TCAS display presents the numerics either above or below the symbol for conceptual compatibility. No effort has been made to explore other innovative approaches or to empirically validate current design concepts. [emphasis added]

As described above, Hancock *specifically searches for a way to display differential altitude to an aircraft operator*. Therefore, Hancock teaches away from a combination with Beasley and/or Masumoto that would provide a display of absolute altitude for his application.

In view of the above, Applicants submit that independent Claims 1 and 9-13 are patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto.

Claim 11 is further patentably distinct over the combination cited by the Examiner since the references neither describe nor suggest that the characteristic of the icon that changes is intensity and/or shape. Applicants can find no mention in any of the references of a changing icon shape or intensity as called for in Claim 11.

Claims 2-8 and 14-22 depend from and thus include the limitations of Claim 1. Claims 23-24 depend from and thus include the limitations of Claim 12. Claims 25-38 depend from and thus include the limitations of Claim 13. Thus, Applicants submit that Claims 2-8, 14-38 are patentably distinct over the cited references at least for the reasons discussed above in conjunction with Claims 1, and 9-13.

Applicants submit that Claim 5 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is selected from a limited number of discriminably different sizes," as set forth in Claim 5. With regard to Claim 5, the Examiner asserts, "...Hancock discloses that the size of the icon is selected from a limited number of discriminably different sizes (See Fig 1-2)." However, Applicants submit that the icons shown in Figs. 1 and 2 have sizes that are a continuous function of altitude (i.e., have an essentially limitless number of sizes) and not the claimed limited number of sizes. Applicants note that in regard to Claim 6, the Examiner states that "Hancock discloses a "...continuously variable relationship between the icon size ant the third coordinate z. (See Fig 1-2)," which apparently agrees with the Applicants position regarding Claim 5.

Applicants submit that Claim 7 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is directly correlated with the third coordinate z, such that a larger value of the third coordinate z correlates with a larger size of the icon," as set forth in Claim 7. Applicants respectfully remind the Examiner that "the third coordinate z represents an absolute altitude of the object relative to a geographic reference," as set forth in Claim 1.

Similarly, Applicants submit that Claim 8 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "... the size of the icon is inversely correlated with the third coordinate *z*, such that a larger value of the third coordinate *z* correlates with a smaller size of the icon," as set forth in Claim 8.

With respect to Claims, 14, 15, 16, 17, 18, 22, 30, 31, 32, 33, 34, and 38, which recite that the characteristic of the icon that changes is *intensity and/or shape*, the Examiner has apparently not found the Applicants arguments set forth in a Response filed on August 29, 2005 to be persuasive. Applicants again set forth below similar arguments, submitting that neither Hancock, Beasley, nor Masumoto describe or suggest that the characteristic of the icon that changes is *intensity and/or shape*. Applicants can find *no mention in any of the references of a changing icon shape or intensity*. These and other claims are further discussed below.

Applicants submit that Claim 14 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the characteristic of the icon which changes is intensity of the icon and said third means is for correlating the third coordinate *z* with the intensity of the icon," as set forth in Claim 14.

With regard to Claims 14, the Examiner asserts, "...Hancock further discloses that the characteristic of the icon which changes is intensity [i.e. intensity of color, as manipulating the

intensity of color is well known in an analogous are in the process of bit manipulation]... ." Applicants respectfully submit that the Examiner may be confusing color with intensity and that color and intensity are two separate and distinct image characteristics. For example, an icon shown in grayscale, i.e., without color, can also have an intensity (e.g., a brightness). The Examiner asserts that the claimed representation of aircraft altitude by intensity of an aircraft icon is obvious, without supporting backup, and Applicants do not agree. The references used by the Examiner do not support the Examiner's assertion.

For substantially the same reasons discussed above in conjunction with Claim 14, Applicants submit that Claim 15 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the intensity of the icon is selected from a limited number of discriminably different intensities," as set forth in Claim 15.

For substantially the same reasons discussed above in conjunction with Claims 7 and 14, Applicants also submit that Claim 16 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...said third means includes a continuously variable relationship between the intensity of the icon and the third coordinate *z*," as set forth in Claim 16.

With regard to Claim 16, the Examiner asserts, "...Hancock discloses that continuously variable relationship between the intensity of the icon and the third coordinate z... ." The Examiner cites Hancock at the abstract and at column 2, lines 21-24 and lines 31-36 in support of his assertion. Contrary to the Examiner's assertion, Applicants can find no mention of intensity in Hancock. As suggested above in conjunction with Claims 14, Applicants respectfully submit that the Examiner may be confusing color with intensity and that color and intensity are two separate and distinct characteristics.

For substantially the same reasons discussed above in conjunction with Claims 7, 14, and 16, Applicants submit that Claim 17 is further patentably distinct over Hancock, whether taken

alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the intensity of the icon is directly correlated with the third coordinate *z*, such that a larger value of the third coordinate *z* correlates with a higher intensity of the icon," as set forth in Claim 17.

For substantially the same reasons discussed above in conjunction with Claims 7 and 16, Applicants also submit that Claim 18 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the intensity of the icon is inversely correlated with the third coordinate *z*, such that a larger value of the third coordinate *z* correlates with a lower intensity of the icon," as set forth in Claim 18.

For substantially the same reasons discussed above in conjunction with Claim 7, Applicants submit that Claim 19 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the characteristic of the icon which changes is one or more colors of the icon and said third means is for correlating the third coordinate *z* with the one or more colors of the icon," as set forth in Claim 19. Applicants again remind the Examiner that the third coordinate z represents an absolute altitude relative to a geographic reference.

Applicants submit that Claim 21 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest, "...aspects of the one or more colors of the icon have a continuously variable relationship with the third coordinate z," as set forth in Claim 21. In contrast, Hancock teaches in Column 4, lines 8-42, that the aircraft symbol can be red or yellow, indicative of an "advisory condition" and a "traffic alert," respectively, which represent a limited number of discrete colors, and which are not representative the third coordinate *z*, which corresponds to absolute altitude.

Applicants submit that Claim 22 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the characteristic of the icon which changes is *shape of the icon* and said third means is for correlating the third coordinate *z* with the shape of the icon," as set forth in Claim 22. Applicants submit that a shape is irrespective of a size. Applicants can find no mention in the references of a changing shape of an icon on a display.

For substantially the same reasons discussed above in conjunction with Claim 5, Applicants submit that Claim 26 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the size of the icon is selected from a limited number of discriminably different sizes," as set forth in Claim 26.

For substantially the same reasons discussed above in conjunction with Claim 7, Applicants submit that Claim 28 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...correlating includes a direct relationship between the size of the icon and the third coordinate *z*, such that a larger value of the third coordinate *z* results in a larger size of the icon," as set forth in Claim 28. Applicants respectfully remind the Examiner that the third coordinate z represents an absolute altitude relative to a geographic reference.

Similarly, Applicants submit that Claim 29 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...said correlating includes an inverse relationship between the size of the icon and the third coordinate *z*, such that a larger value of the third coordinate *z* results in a smaller size of the icon," as set forth in Claim 29.

For substantially the same reasons discussed above in conjunction with Claim 14, Applicants submit that Claims 30-34 are further patentably distinct over Hancock, whether taken

alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...intensity of the icon... ," as set forth in Claims 30-34.

For substantially the same reasons discussed above in conjunction with Claim 21, Applicants submit that Claim 37 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...aspects of the one or more colors of the icon have a continuously variable relationship with the third coordinate *z* ... ," as set forth in Claim 37.

For substantially the same reasons discussed above in conjunction with Claim 22, Applicants submit that Claim 38 is further patentably distinct over Hancock, whether taken alone or in combination with Beasley and Masumoto, since the cited references neither describe nor suggest "...the characteristic of the icon which changes is shape of the icon ... ," as set forth in Claim 38.

Accordingly, Applicants submit that the rejection of Claims 1-38 under 35 U.S.C. §103(a) should be removed.

In view of the above Remarks, Applicants submit that Claims 1-38 and the entire case are in condition for allowance and should be sent to issue and such action is respectfully requested.

It is submitted that this amendment places the application in condition for allowance or in better form for consideration on appeal, and thus, entry of this amendment is respectfully requested under the provisions of 37 C.F.R. §1.116.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Response or this application.

Appl. No. 10/071,670
Reply to Final Office Action of September 20, 2005

Docket No. RTN-173PUS

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845, including but not limited to, any charges for extensions of time under 37 C.F.R. §1.136.

Respectfully submitted,

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